



Appendix 1

Database portions of U.S. Patents Nos.

6,626,975
6,631,626
6,638,367
and
6,586,327

United States Patent
Gries , et al.

6,626,975
September 30, 2003

Method for producing hard metal mixtures

Abstract

The invention relates to a method for producing a homogeneous mixture of hard material powders and binder metal powders without using grinding bodies, liquid grinding auxiliary agents and suspending media. According to the invention, the mixture components are mixed at close range while generating a high shearing collision velocity of the powder particles and are remotely mixed by rotating the mixing bed without resulting in a particle size reduction of the hard material powders.

Inventors: **Gries; Benno** (Wolfenbuttel, DE); **Bredthauer; Jorg** (Bonn, DE)
Assignee: **H. C. Starck GmbH & Co. KG** (Goslar, DE)
Appl. No.: **889299**
Filed: **July 13, 2001**
PCT Filed: **January 5, 2000**
PCT NO: **PCT/EP00/00043**
PCT PUB.NO.: **WO00/42230**
PCT PUB. Date: **July 20, 2000**

Foreign Application Priority Data

Jan 15, 1999[DE] 199 01 305

Current U.S. Class: 75/228; 419/32; 428/404
Intern'l Class: B22F 001/00; B22F 003/00
Field of Search: 419/32,33 75/228 428/404

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00/03049	Jan., 2000	WO.

Primary Examiner: Mai; Ngoclan

Attorney, Agent or Firm: Akorli; Godfried R., Eyl; Diderico van

Claims

What is claimed is:

1. A method for producing a homogeneous mixture of a mix material comprising powders of a hard material and of binder metal without the use of grinding agents, liquid grinding aids or suspending agents, comprising
 - (a) subjecting a mix material to short-range mixing by generating a high shearing impact velocity of the powder particles, and
 - (b) subjecting the mixing material to long-range mixing by recirculating the mix material, and thereby forming a homogeneous mixture of a mix material comprising powders of a hard material and a binder metal.
2. The method according to claim 1, wherein during short-term mixing, the mix material is fluidized and the high impact velocity is generated by the turbulence of the liquid.
3. The method according to claim 1, wherein that long-range mixing is effected in a stirred vessel with slowly rotating stirring elements.
4. The method according to claim 1, wherein the mix material is fluidized during both the short-range and long-range mixing.
5. The method according to claim 1, wherein the total mixing time is less than 1 hour.

6. The method according to claim 1, wherein the mix material additionally contains pressing aids.
7. The method according to claim 1, wherein the powder mixture is granulated.
8. The method according to claim 1, wherein the hard metal is selected from the group consisting of carbides, nitrides, carbonitrides of refractory metals of Subgroups IV, V, and VI of the periodic chart of elements, and combinations thereof.
9. The method according to claim 1, wherein the hard metal is selected from the group consisting of titanium carbide, titanium carbonitride, tungsten carbide, and combinations thereof.
10. A hard metal mixture *produced according to claim 1*.

United States Patent
Hahn

6,631,626

October 14, 2003

Natural gas liquefaction with improved nitrogen removal

Abstract

Natural gas liquefaction system employing a zeolite adsorbent for removing nitrogen from pretreated natural gas.

Inventors: **Hahn; Paul R.** (Houston, TX)

Assignee: **ConocoPhillips Company** (Houston, TX)

Appl. No.: **217255**

Filed: **August 12, 2002**

Current U.S. Class:

62/612; 62/618

Intern'l Class:

F25J 003/08

Field of Search:

62/611,612,613,618,619,424

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Primary Examiner: Esquivel; Denise L.

Assistant Examiner: Drake; Malik N.

Attorney, Agent or Firm: Haag; Gary L.

Claims

What is claimed is:

1. In a process for liquefying natural gas, the improvement comprising:

(a) removing nitrogen from the natural gas using a molecular sieve having a pore size in the range of

from about 3.5 to about 4.0 angstroms;

- (b) using at least a portion of the natural gas as a refrigerant in a methane economizer; and
- (c) downstream of the molecular sieve, compressing at least a portion of the natural gas used as a refrigerant.

2. A process according to claim 1,

step (a) including adsorbing the nitrogen with the molecular sieve.

3. A process according to claim 2; and

(d) desorbing the nitrogen from the molecular sieve.

4. A process according to claim 3,

steps (a) and (b) being steps of a pressure swing adsorption process.

5. A process according to claim 1; and

(e) upstream of the molecular sieve, removing an acid gas from the natural gas.

6. A process according to claim 1; and

(f) upstream of the molecular sieve, removing water from the natural gas.

7. A process according to claim 1; and

(g) upstream of the molecular sieve, removing mercury from the natural gas.

8. A process according to claim 7; and

(h) downstream of the molecular sieve, cooling the natural gas in an ethylene chiller.

9. A process according to claim 8; and

(i) downstream of the molecular sieve, cooling the natural gas in a propane chiller.

10. A process according to claim 7; and

(j) upstream of the molecular sieve, cooling the natural gas in a propane chiller.

11. A process according to claim 10; and

(k) upstream of the molecular sieve, cooling the natural gas in an ethylene chiller.

12. A process according to claim 11; and

(l) upstream of the molecular sieve, cooling the natural gas in the methane economizer.

13. A process according to claim 1,
said molecular sieve having a pore size in the range of about 3.6 to about 3.8 angstroms.
14. A process according to claim 1,
said molecular sieve having a pore size in the range of from 3.65 to 3.75 angstroms.
15. A process according to claim 1,
said molecular sieve being a titanium silicate zeolite.
16. A process according to claim 15,
said zeolite being selected from the group consisting of ETS-4, BaETS-4, CTS-1, and combinations thereof.
17. A process according to claim 1; and
(m) vaporizing the liquefied natural gas product produced via steps (a)-(c).
18. A liquefied natural gas product produced by the process of claim 1.

United States Patent
Ohmori , et al.

6,638,367
October 28, 2003

Method of producing highly weather-resistant magnet powder, and product produced by the same method

Abstract

The objects of the present invention are to provide a method of producing highly weather-resistant iron-based magnet powder containing a rare-earth element, particularly characterized by high coercive force in a practically important humid atmosphere, highly weather-resistant magnet powder produced by the same method, resin composition containing the same powder for bonded magnets, and bonded magnet containing the same powder. The present invention provides a method of producing a magnet powder by crushing an iron-based magnet powder containing a rare-earth element in an organic solvent, wherein phosphoric acid is added to the solvent in which the powder is crushed.

Inventors: **Ohmori; Kenji** (Chiba, JP); **Osako; Toshiyuki** (Chiba, JP); **Hashiguchi; Kayo** (Chiba, JP); **Yokosawa; Kouichi** (Chiba, JP)

Assignee: **Sumitomo Metal Mining Co., Ltd.** (Tokyo, JP)

Appl. No.: **955335**

Filed: **September 19, 2001**

Current U.S. Class: **148/105; 148/101; 148/253; 252/62.54; 241/17; 241/23**

Intern'l Class: **H01F 001/03; C22C 022/07**

Field of Search: **148/101,122,253,105 252/62.54 241/17,23**

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European Search Report dated Jan. 9, 2002.

Primary Examiner: Sheehan; John

Attorney, Agent or Firm: Armstrong Westerman & Hattori, LLP

Claims

We claim:

1. A method of producing a highly weather-resistant magnet powder comprising the steps of:
crushing an iron-based magnet alloy powder containing a rare-earth element in an organic solvent which contains phosphoric acid at more than 0.1 mol but less than 2 mols per kg of the magnet alloy powder to the solvent in which said powder is crushed, and said magnet alloy powder is thermally treated at 100.degree. C. or higher but lower than 400.degree. C. in an inert or vacuum atmosphere.
2. A highly weather-resistant magnet powder *produced by claim 1.*

United States Patent
Shepard

6,586,327
July 1, 2003

Fabrication of semiconductor devices

Abstract

Fabrication of microelectronic devices is accomplished using a substrate having a recessed pattern. In one approach, a master form is used to replicate a substrate having a pit pattern. In another approach, the substrate is produced by etching. A series of stacked layers having desired electrical characteristics is applied to the substrate and planarized in a manner that creates electrical devices and connections therebetween. The microelectronic devices can include a series of row and columns and are used to store data at their intersection.

Inventors: **Shepard; Daniel R.** (North Hampton, NH)

Assignee: **NUP2 Incorporated** (North Hampton, NH)

Appl. No.: **965622**

Filed: **September 27, 2001**

Current U.S. Class: **438/626; 257/E21.548; 257/E21.549; 438/43; 438/629; 438/640**

Intern'l Class: **H01L 021/476.3; H01L 021/00**

Field of Search: **438/43,618,598,599,625,626,629,640,675,638**

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Primary Examiner: Niebling; John F.

Assistant Examiner: Simkovic; Viktor

Attorney, Agent or Firm: Testa, Hurwitz & Thibeault, LLP.

Parent Case Text

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefits of United States Provisional Application No. 60/235,853, filed on Sep. 27, 2000, the entire disclosure of which is hereby incorporated by reference.

Claims

What is claimed is:

1. A method of fabricating an electronic device, the method comprising the steps of:
 - a. fabricating a form having a raised topology complementary to a desired pattern of pits and channels;
 - b. applying the form to a moldable material to impose the pattern therein; and
 - c. applying to the patterned material a series of layers having desired electrical properties to create the electronic device.
2. The method of claim 1 wherein the form is fabricated according to steps comprising:
 - a. providing an etchable master substrate;

- b. etching the pattern into the master substrate; and
- c. forming a topology complementary to the pattern to serve as the form.

3. The method of claim 1 wherein the pattern is imposed on the substrate by injection molding.

4. The method of claim 1 wherein the pits are pyramidal pits and the channels are V-grooves.

5. The method of claim 1 wherein the layers form a matrix of nonlinear elements.

6. The method of claim 1 wherein the channels include a first series of channels running in a first direction and a second series of channels running in a second direction substantially perpendicular to the first direction, wherein:

- a. the first-series channels and the second-series channels cross at crossing points;
- b. the pits are located at the crossing points;
- c. the layers form nonlinear elements in at least some of the pits, the nonlinear elements each connecting a first-series channel with a second-series channel.

7. The method of claim 6 wherein the electronic device is a memory circuit having data contents, the nonlinear elements being distributed among the pits in a scheme defining the data contents.

8. The method of claim 6 wherein the electronic device is a memory circuit having data contents, the nonlinear elements being selectively enabled in a scheme defining the data contents.

9. The method of claim 7 wherein the nonlinear elements are diodes.

10. The method of claim 7 wherein the pits have sizes, the size of a pit determining whether a nonlinear element is formed at the crossing point of the pit.

11. The method of claim 1 wherein the material is insulative.

12. A method of fabricating a memory device having data contents, the method comprising the steps of:

- a. defining a pattern of pits and channels on a substrate, the channels including a first series of channels running in a first direction and a second series of channels running in a second direction substantially perpendicular to the first direction, wherein (i) the first-series channels and the second-series channels cross at crossing points, and (ii) the pits are located at the crossing points; and
- b. forming nonlinear elements in at least some of the pits.

13. The method of claim 12 wherein the nonlinear elements each connect a first-series channel with a second-series channel and are distributed among the pits in a scheme defining the data contents.

14. The method of claim 12 wherein the nonlinear elements each connect a first-series channel with a second-series channel and are selectively enabled in a scheme defining the data contents.

15. The method of claim 12 wherein the nonlinear elements are diodes.

16. The method of claim 12 wherein the pits have sizes, the size of a pit determining whether a nonlinear element is formed at the crossing point of the pit.
17. The method of claim 12 wherein the substrate is insulative.
18. A method of fabricating a microelectronic device, the method comprising the steps of:
 - a. defining a pattern on a substrate having a surface, the pattern comprising recesses descending below the surface of the substrate;
 - b. applying to the patterned substrate a series of layers each having a predetermined electrical property; and
 - c. planarizing following application of at least some of the layers to remove at least some portion of the layers then disposed above the surface of the substrate, the layers cooperating to form an electronic circuit.
19. The method of claim 18 wherein at least some of the planarization steps are accomplished by polishing.
20. The method of claim 18 wherein the pattern comprises a series of pits and channels, the channels including a first series of channels running in a first direction and a second series of channels running in a second direction substantially perpendicular to the first direction, wherein (i) the first-series channels and the second-series channels cross at crossing points, and (ii) the pits are located at the crossing points, the pits having depths determining whether connections are established at the crossing points.
21. A microelectronic device comprising:

a substrate having therein a recessed contour pattern; and

a plurality of stacked layers each having a predetermined electrical characteristic, all of the stacked layers being disposed within the contour pattern and some of the layers also residing on the substrate, the layers cooperating to form the electronic device.
22. The microelectronic device of claim 21 wherein the contour pattern further comprises a series of pits and channels, the channels including a first series of channels running in a first direction and a second series of channels running in a second direction substantially perpendicular to the first direction, wherein (i) the first-series channels and the second-series channels cross at crossing points, and (ii) the pits are located at the crossing points.
23. The microelectronic device of claim 22 wherein the pits have depths determining whether a non-linear element is formed from the plurality of stacked layers at the crossing points.
24. The microelectronic device of claim 23 wherein the non-linear element is a diode.
25. The microelectronic device of claim 21 wherein the plurality of stacked layers is planarized to a predetermined height.
26. A product *produced in accordance with claim 1.*

Appendix 2

Copy of International Search Report
issued in the corresponding Int. Application
No. PCT/CA00/01314

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 492-PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/CA 00/01314	International filing date (day/month/year) 06/11/2000	(Earliest) Priority Date (day/month/year) 17/11/1999
Applicant ITF OPTICAL TECHNOLOGIES INC. - TECHNOLOGIES ...		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.
 It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
 - a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
 - b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
 - contained in the international application in written form.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority in written form.
 - furnished subsequently to this Authority in computer readable form.
 - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished
2. **Certain claims were found unsearchable** (See Box I).
3. **Unity of invention is lacking** (see Box II).
4. With regard to the **title**,
 - the text is approved as submitted by the applicant.
 - the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
 - the text is approved as submitted by the applicant.
 - the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the **drawings** to be published with the abstract is Figure No. **9**.
 - as suggested by the applicant.
 - because the applicant failed to suggest a figure.
 - because this figure better characterizes the invention.

None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 00/01314

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02B6/287

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99 23518 A (APPLIED FIBER OPTICS INC) 14 May 1999 (1999-05-14) abstract; figures 1,6A page 3, line 18 - line 26 page 8, line 11 - line 35 ---	1-19
A	US 5 121 453 A (ORAZI RICHARD J ET AL) 9 June 1992 (1992-06-09) abstract; figure 3 column 4, line 3 - line 55 column 5, line 63 -column 6, line 29 ---	1-19
A	US 5 064 267 A (ROSSBERG ROLF) 12 November 1991 (1991-11-12) abstract; figure 1 ---	1-19 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubt on priority; claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

& document member of the same patent family

Date of the actual completion of the international search

8 February 2001

Date of mailing of the international search report

16/02/2001

Name and mailing address of the ISA

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Authorized officer

Jakober, F

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/CA 00/01314

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 00/01314

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 13711 A (BLOOM CARY) 2 April 1998 (1998-04-02) abstract; figure 1 page 3, line 6 - line 22 -----	1-19